Water testing

Safe. Clean. Compliant.

Guide to bacteriological testing of drinking water according to ISO standards

Simple and complete solutions

As a manufacturer, service provider or a contract testing laboratory, you know the importance of safeguarding your customers from potential hazards associated with water. Whether in your products or used alongside them, adherence to published standards is paramount.

Our range of products for water testing includes dehydrated and prepared media, membrane filters, and quality control organisms, as well as the equipment you need to deliver reliable results.

This Guide to the bacteriological testing of water provides an overview of the standard ISO procedures and illustrates how our extensive range of microbiology products for the isolation, identification and enumeration of waterborne pathogens and quality indicators can meet your testing needs.

Safe. Clean. Compliant.

Together we can ensure water safety and quality

A rich history of providing microbiology and molecular solutions for water testing

High quality media compliant to ISO requirements for performance and filter combination testing.

Full range of products including peptones, plates, filters and molecular solutions

Service beyond the norm by expert microbiologists

Full manufacturing process traceability from raw materials to final products

Sustainability and attention to waste with Tailored Delivery Solutions

Our expertise in water testing

Our team has a rich history of providing microbiology and molecular testing solutions

Every day we partner with our customers to provide high quality, compliant testing solutions

thermo scientific

OXOID

remel

FINNZYMES
TOOLS FOR MOLECULAR BIOLOGY

invitrogen

life technologies™

Compliance for peace of mind

ISO certifications and accreditations relevant to Thermo Scientific water microbiology testing products

Thermo Fisher microbiology manufacturing and testing sites comply with all requirements of **ISO 11133:2014**[1] for the manufacture, storage, and performance testing for media preparation.

Our manufacturing sites are **ISO 13485:2016**[2] (BSI MD 741787) and **ISO 9001:2015**[3] (BSI FM 741490) certified, for the prepared media in Petri dishes and tubes and sales of in-vitro-diagnostics (IVD) for microbiology.

Our specialists are **ISO/IEC 17025:2018**[4] (D-PL-20190-01-00) accredited to carry out microbiological analysis of culture media in foodstuffs, feedstuffs and water.

Our quality control laboratories are accredited by DAkkS body according to **ISO/IEC 17025:2017**[4] requirements.

Thermo Fisher sites for the manufacture of quality control organisms are **ISO 17034:2016**[5] certified facilities (Many Thermo Scientific™ Culti-Loops™ QC organisms are Certified Reference Materials).

Certificates of Analysis

- Certificates of Analysis available for all batches/lots of product.
- Quality control testing performed in accredited laboratories to ensure compliance with the globally recognized ISO 17025:2017 quality management.
- Transportation stability reports available and data loggers utilized for prepared plate media.
- Filter compatibility testing conducted and recorded for all relevant plate media (use any filter lot with any agar plate lot).

References

1. ISO 11133:2014 (en) Microbiology of food, animal feed and water — Preparation, production, storage and performance testing of culture media
2. ISO 13485:2016 (en) Medical devices — Quality management systems — Requirements for regulatory purposes
3. ISO 9001:2015(en) Quality management systems — Requirements
4. ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories
5. ISO 17034:2016 General requirements for the competence of reference material producers

Complete traceability through the full manufacturing and supply process

Rigorous quality built into every step, confidence in every result.

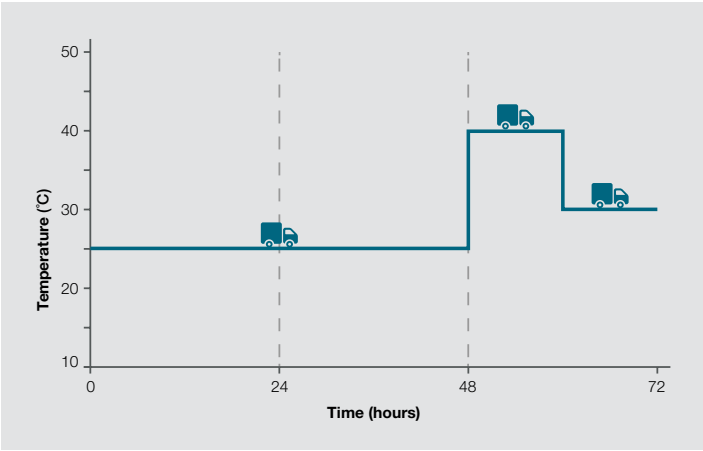
- We rigorously trace our manufacturing process at every step from raw materials to final product to ensure quality and robustness.
- We regularly perform trend analysis to ensure product quality and performance.
- We conduct simulation studies according to SOP BT-SOP-6958 procedure (ISO) to assess product performance during room temperature transportation.
- We provide data loggers to monitor temperature during shipping in accordance with ISO.

Plate stability transport simulation and transport data tracking

Thermo Scientific Prepared Plate Media products are proven to perform to expected high standards throughout their entire shelf-life. For refrigerator-stored products, transportation studies designed to simulate real European transportation parameters are conducted as part of ISO 15189 certification according to SOP BT-SOP-6958 (25°C for 48 hours, followed by 35-39°C for 8 hours, followed by 30°C for 16 hours) to prove the stability of performance through product shelf-life.

Transportation stability reports are available on request for the following prepared plate media:

Description	Format	Order code
Brilliance™ Chromogenic Coliform Agar (ISO)	10 x 90 mm plates	PO5318A
Cetrimide Agar	10 x 90 mm plates	PO5076A
Enterococcus Selective Agar (BAA)	10 x 90 mm plates	PO5062A
Legionella BCYE Medium with Antibiotics	10 x 90 mm plates	PO5325A
Legionella BCYEa with Cystein	10 x 90 mm plates	PO5072A
Legionella GVPC Agar	10 x 90 mm plates	PO5074A
Legionella GVPC Agar	10 x 90 mm plates	PO0245A
Slanetz-Bartley Agar	10 x 55 mm plates	PO5410J
Tryptone Soya Agar	10 x 90 mm plates	PO5012A



Contact your local customer services team or account manager to request stability reports.

Transport Data Logger

Prepared Media transport temperature and time tracking

The single-use Transport Data Logger USB supplied with your Thermo Scientific™ Prepared Media delivery enables you to see the temperature and time period for your consignment. Following the first 60 minutes after packaging, the Transport Data Logger captures a temperature reading every 30 minutes, for up to 60 days, or until stopped. Date and times are at British Summer Time (BST).

Use the transport data captured by the Data Logger USB to ensure that the validated room temperature storage parameters, or shelf-life report with transportation simulation, have not been exceeded.

The Transport Data Logger USB is supplied sealed to ensure data security and integrity.

Description	Format	Order code
Transport Data Logger	Single-use 1 USB	DATALOG

Our sustainability and attention to waste

Increase sustainability and efficiency with our Tailored Delivery Solution (TDS)

Customizable
Maximise stock delivery frequency and quantity for Prepared Media orders to suit your changing laboratory needs

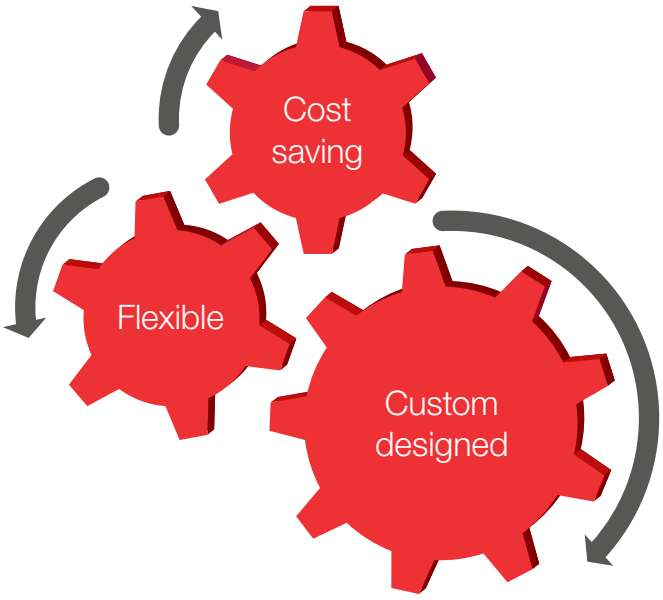
Sustainable
Reduce waste and cardboard box recycling

Compliant
Seperate Quality Control media box with one pack per batch for incoming goods testing

Efficient
Convenient barcodes on the outside of trolleys/crates for ease of scanning and inputting into the inventory system

Ergonomic
Eliminate need for unpacking boxes and heavy lifting

Find out more at **thermofisher.com/TDS**

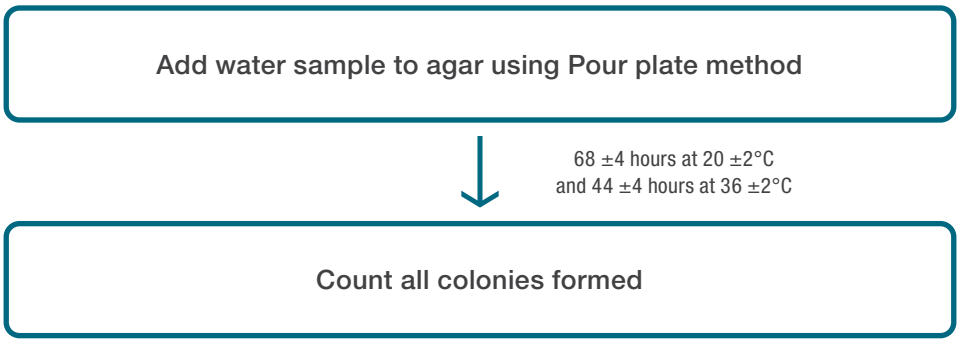


Our extensive range of water testing products

Enumeration of culturable microorganisms

Colony counts at 22°C and 36°C

Method according to EN ISO 6222:1999



Detection of microorganisms – Colony count number at 22°C and 36°C

Method	Media	Product	Format	Product Code
EN ISO 6222:1999				
Pour plate	Yeast Extract Agar	Plate Count Agar for water testing (ISO)	500 g Dehydrated culture media	CM1012B
		Plate Count Agar	10 x 100 mL bottles Prepared media	BO0055M
			10 x 200 mL bottles Prepared media	BO0055R

Clostridium perfringens (including spores)

Method according to ISO 14189:2013

Membrane filtration of 100 mL onto TSC-Agar* (if necessary, dilute sample)

↓ 44 ±1°C, anaerobic 21±3 hours

Count the presumptive colonies which show black or grey to yellow brown staining within 30 minutes of opening

Count all black or grey to yellow brown colonies as *Clostridium perfringens*

1-10 black or grey to yellow-brownish colonies	>10 black or grey to yellow-brownish colonies
Subculture all presumptive colonies onto blood agar plates (Alternatively, Columbia Agar or another nutrient rich agar can be used)	Subculture 10 different presumptive colonies onto blood agar plates (Alternatively, Columbia Agar or another nutrient rich agar can be used)
↓ 36 ±2°C, anaerobic 21 ±3 hours	↓ 36 ±2°C, anaerobic 21 ±3 hours

Put colonies that grew under anaerobic conditions onto filter paper and add 2-3 drops of phosphate acid. All colonies that turn purple within 3-4 minutes are confirmed positive.

*__ATTENTION:__ Alternatively, a thin layer (approximately 5 mL to 10 mL) of molten TSC Agar (TV5204G TSC Agar Base), as an overlay on the filter can be used. Allow to solidify before anaerobic incubation. This method may enhance the blackening of the colonies. Medium without cycloserine; e.g. TV5204G TSC Agar Base, 20 mL.

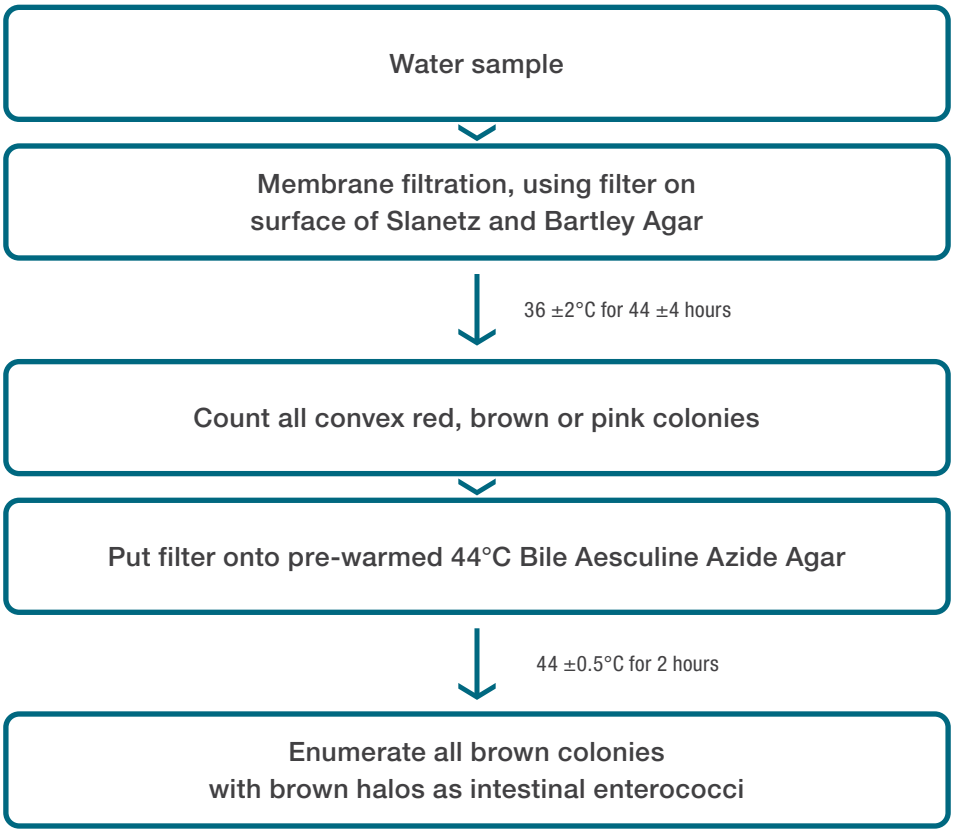
Melt TSC Agar in a water bath and put melted agar onto filter on the plate.

Melt agar in a water bath at 95°C for approx. 10–15 minutes › Cool medium to 45°C › Shake tube carefully and pour a thin layer of molten agar

Enterococci

Colony counts at 22°C and 36°C

Method according to ISO 7899-2:2000



Enterococci
Continued

Enterococci

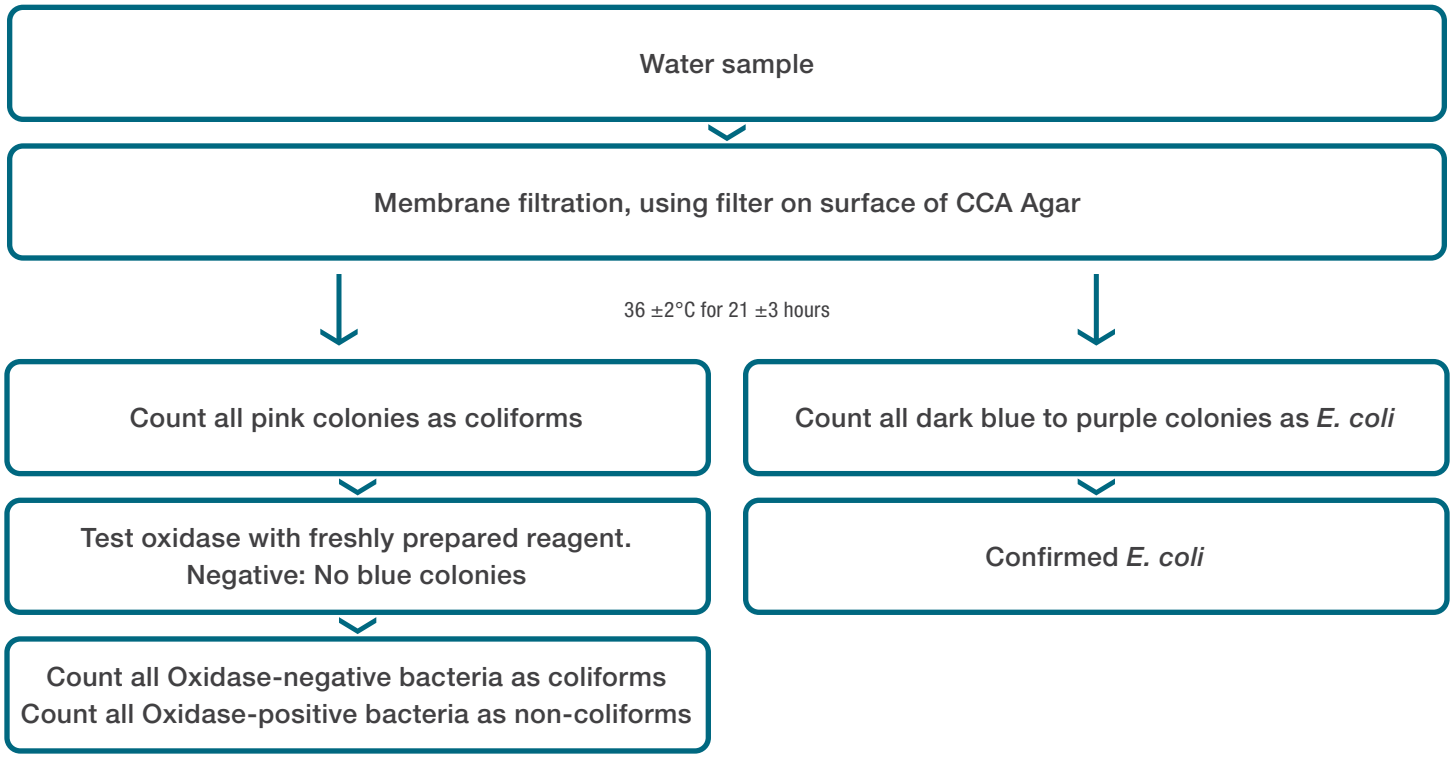
Method	Media	Product	Format	Product code
EN ISO 7899-2:2000				
Membrane filtration	Slanetz Bartley Agar	Slanetz Bartley Agar	500 g Dehydrated culture media	CM0377B
			10 x 90 mm plates Prepared media	PO5018A
			10 x 55 mm plates Prepared media	PO5410J*
			10 x 55 mm plates Prepared media	PO5423J*
Confirmation	Bile Aesculine Azide Agar	Enterococcus Selective Medium (Bile Aesculine Azid Agar)[1]	10 x 90 mm plates Prepared media	PO5062A
		or Kanamycin Aesculin Azide Agar Base[2]	500g Dehydrated culture media	CM0591B
			10 x 90 mm plates Prepared media	PO5059A

* Minimum order quantity required.

1. This medium is slightly different to the medium formulation according to ISO 7899-2:2000.
2. The medium has additional sodium citrate and 20 g/l ox bile instead of 10 g/l and 0.55 g/l sodium azide instead of 0.15 g/l.
3. This medium is slightly different to the medium formulation according to ISO 7899-2:2000. It contains sodium citrate instead of ox bile and Kanamycin.

Escherichia coli / Coliform bacteria

Method according to ISO 9308-1:2014



Escherichia coli and coliform

Method	Media	Product	Format	Product Code
EN ISO 9308-1:2014 Standard test				
Membrane filtration	CCA Agar	Thermo Scientific™ Chromogenic Coliform Agar	500 g Dehydrated culture media	CM1205B
			10 x 90 mm plates Prepared media	PO5318A
			10 x 55 mm plates Prepared media	PO5428J
Oxidase test	Tryptone Soya Agar (TSA)	CASO AGAR (TSA)	500 g / 5 kg Dehydrated culture media	CM0131B/T
			10 x 90 mm plates Prepared media	PO5012A
	Oxidase Reagent	Thermo Scientific™ BactiDrop™ Oxidase Reagent	50 vials Dehydrated culture media	R21540
			10 x 90 mm plates Prepared media	PO5321A
		Thermo Scientific™ Microbact™ Oxidase Strips	50 strips Dehydrated culture media	MB0266A

Legionella

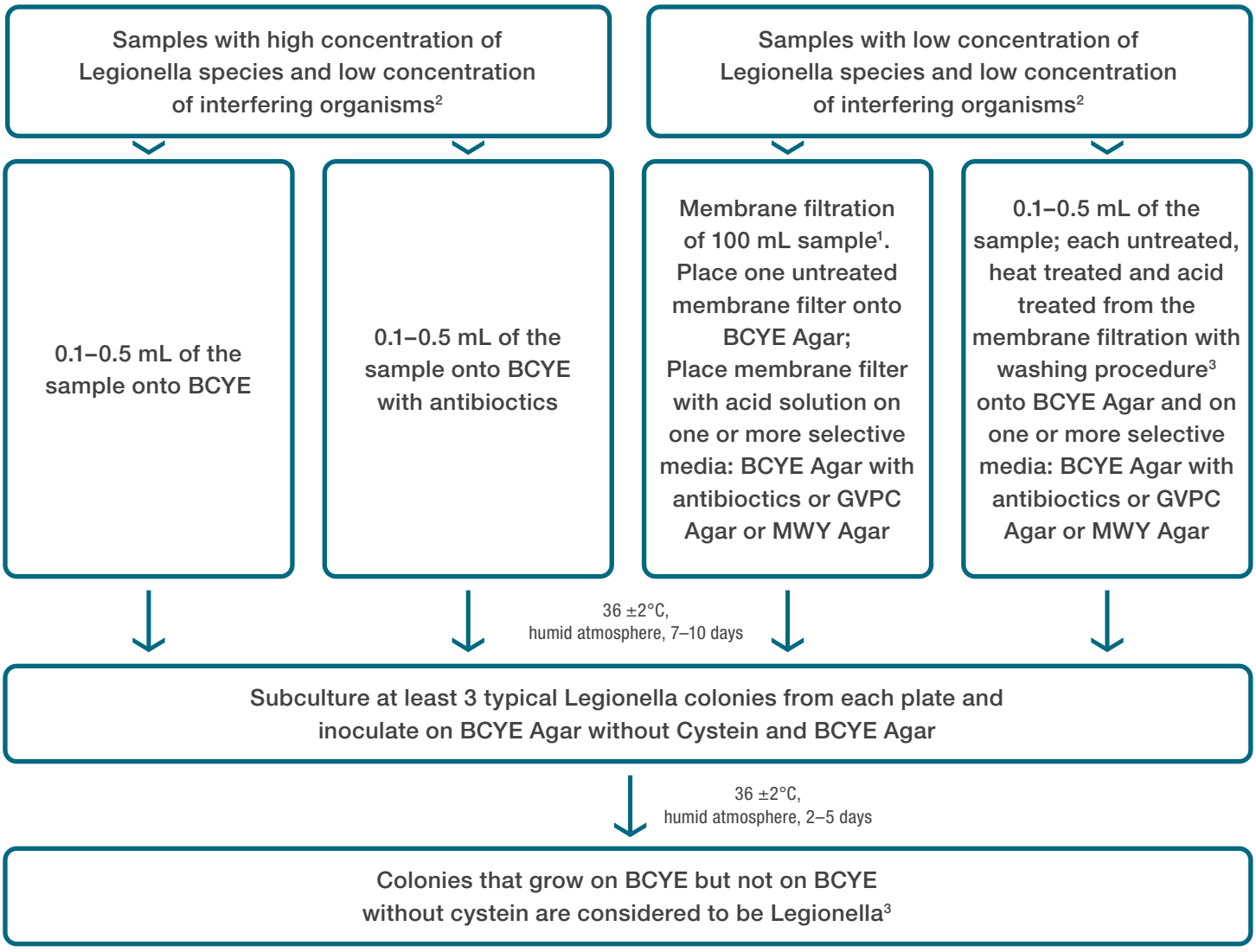
Methods according to ISO 11731:2017

Sample preparation

Heat treated: Put sample into water bath for 30 ±2 minutes at 50 ±1°C

Acid treated: 1 part sample to 9 parts of acid buffer. Mix well and leave it for 5 ±0.5 minutes.

Acid treated filter: Put 30 mL of acid solution onto the membrane filter. Leave it for 5 ±0.5 minutes and remove the solution by filtration. Wash with 20 mL of either sterile Aqua dest., Pages Saline, Ringer Solution or PBS.



1. 10–1000 mL sample volume according to ISO 11731-2.
2. The choice of the method for the enumeration of Legionella species depends on the origin/characteristics of the sample and the reason for sampling or investigation. A decision matrix can be found in the ISO 11731:2017, Annex J.
3. Further information, please see ISO 11731:2017.

Legionella
Continued

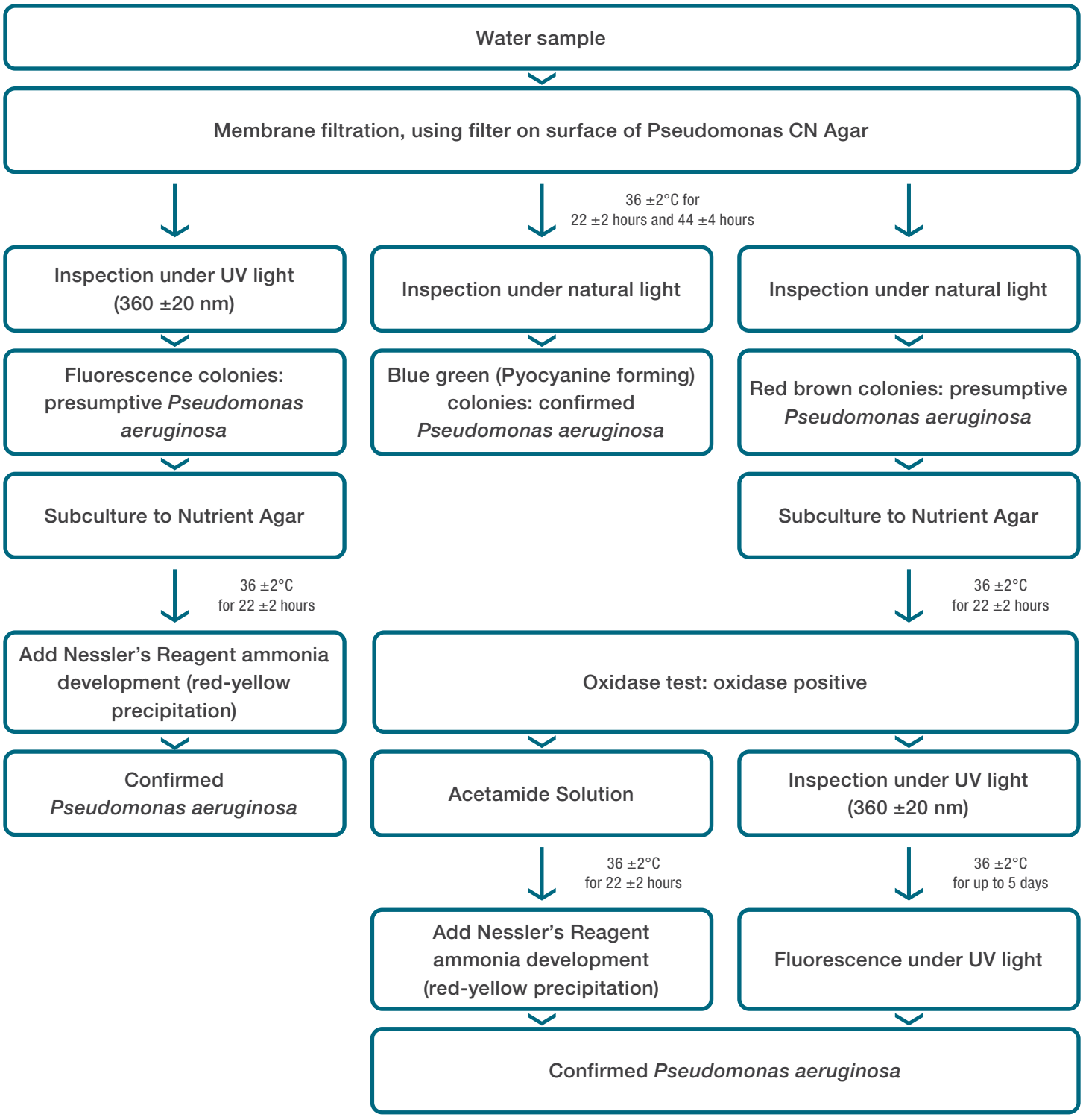
Legionella

Method	Media	Product	Format	Product code
ISO 11731:2017 and EN ISO 11731-2				
Sample preparation	Acid Buffer	Legionella Acid Buffer Solution	4 x 1 L bottles Prepared media	EB1375W
Direct and membrane filtration	Legionella GVPC Agar	Legionella GVPC Selective Agar	10 x 90 mm plates Prepared media	PO5074A
			10 x 90 mm plates Prepared media	PO0245A
		Legionella CYE Agar-Base +	500 g Dehydrated culture media	CM1203B
		Legionella BCYE Supplement +	10 tubes (500 mL) Dehydrated culture media	SR0251C
		Legionella GVPC Selective Supplement	10 tubes (500 mL) Dehydrated culture media	SR0252E
	Legionella GVPC Agar with antibiotics	Legionella GVPC Agar with antibiotics	10 x 90 mm plates Prepared media	PO5325A
	Legionella BCYE Agar	Legionella BCYE Agar	10 x 90 mm plates Prepared media	PO5072A
		Legionella CYE Agar Base +	500 g Dehydrated culture media	CM1203B
		Legionella BCYE Supplement	10 tubes (500 mL) Dehydrated culture media	SR0251C
		Legionella MWY Selective Supplement	10 tubes (500 mL) Dehydrated culture media	SR0255B
	Legionella MWY Agar	Legionella MWY Agar	10 x 90 mm plates Prepared media	PO5071A
		Legionella CYE Agar Base +	500 g Dehydrated culture media	CM1203B
		Legionella BCYE Supplement +	10 tubes (500 mL) Dehydrated culture media	SR0251C
Subculture	Legionella BCYE Agar without Cystein	Legionella BCYE Agar without Cystein	10 x 90 mm plates Prepared media	PO5028A
			10 x 90 mm plates Prepared media	PO0255A*
		Legionella CYE Agar Base +	500 g Dehydrated culture media	CM1203B
		Legionella BCYE without Cystein Supplement	10 tubes (100 mL) Dehydrated culture media	SR0253A
	Legionella BCYE Agar	Legionella BCYE Agar	10 x 90 mm plates Prepared media	PO5072A
		Legionella CYE Agar Base +	500 g Dehydrated culture media	CM1203B
		Legionella BCYE Supplement	10 tubes (500 mL) Dehydrated culture media	SR0251C

* Minimum order quantity required.

Pseudomonas aeruginosa

Method according to ISO 16266:2006



Pseudomonas aeruginosa
Continued

Pseudomonas aeruginosa

Method	Media	Product	Format	Product code
EN ISO 16266:2006				
Membrane filtration	Pseudomonas Selective Agar / CN Agar	Pseudomonas Centrimide Selective Agar	10 x 90 mm plates Prepared media	PO5076A
			10 x 55 mm plates Prepared media	PO5413J*
		Pseudomonas Agar Base	500 g Dehydrated culture media	CM0559B
			10 tubes Dehydrated culture media	SR0102E
Confirmation				
Fluorescence	King´s B Media			
Hydrolysis of acetamide to ammonia	Acetamide Solution Nessler Reagent			
Oxidase Test	Nutrient Agar	Nutrient Agar	500 g Dehydrated culture media	CM0003B
	Oxidase Reagent	BactiDrop Oxidase Reagent	50 vials Dehydrated culture media	R21540
		Microbact Oxidase Strips	50 strips Dehydrated culture media	MB0266A

* Minimum order quantity required.

Filter Funnels and Membranes

Nalgene™ Membrane Filters are cellulose nitrate membranes that are certified for microbiological QC testing and analysis of water.

Product	Size or Quantity	Cat. No.
Nalgene Disposable Analytical Funnels equipped with membrane filter		
Sterile Analytical Filter Units, 100 mL, 47 mm, 0.45 µm, white/black	50 pieces	NG145-0045
Sterile Analytical Filter Units, 250 mL, 47 mm, 0.45 µm, white/black	50 pieces	NG145-2045
Sterile Analytical Filter Units, 100 mL, 47 mm, 0.45 µm, grey/black	50 pieces	NG147-0045
Sterile Test Filter Funnel, 250 mL, 0.45 uL	50 pieces	NG147-2045
Membrane filter		
Membrane Filter for water testing, sterile, CN, 47 mm, 0,45 µm, white/black	100 pieces	NG0205-4045
Membrane Filter for water testing, sterile, CN, 47 mm, 0,45 µm, grey/black	100 pieces	NG0210-6045
Accessories		
Vacuum Manifold	1 piece	NG0345-0001
Filter Stopper, non-sterile, no. 8 rubber	3 pieces	NG0396-0080
Filter Forceps, bent tip	1 piece	NG0399-0001
Filter Forceps, straight tip	1 piece	NG0399-0002
Filter Funnel Adapter, non-sterile	25 pieces	NG0397-0010
Vacuum Gasket, non-sterile thermoplastic elastomer	6 pieces	NG0395-0708
Nalgene Reusable Analytical Filters and accessories		
Filter Funnels with Clamp, 250 mL	1 piece	NG0315-0047
Filter Holders with Receiver, 500 mL, 500 mL	4 pieces	NG0300-4000
Filter Holders with Receiver, 250 mL, 250 mL	4 pieces	NG0300-4050
Filter Holders with Receiver, 500 mL, 1000 mL	4 pieces	NG0300-4100
Filter Holders with Funnel, 250 mL	1 piece	NG0310-4000
Filter Holders with Funnel, 500 mL	1 piece	NG0310-4050
Reusable Bottle Top Filters, 250 mL	1 piece	NG0320-2545
Reusable Bottle Top Filters, 500 mL	1 piece	NG0320-5033
Reusable Bottle Top Filters, 500 mL	1 piece	NG0320-5045

Culti-Loops QC Organisms

Thermo Scientific™ Culti-Loops™ for quality control testing according to ISO 11133:2014

Many of Thermo Scientific Culti-Loops QC organisms are Certified reference materials.

Product	Sample numbers	Cat. No.
***Escherichia coli* QC Organisms for testing of CCA Agar**		
Escherichia coli ATCC® 8739™*	WDCM 00012	R4607085
Escherichia coli ATCC® 25922™*	WDCM 00013	R4607050
Klebsiella aerogenes ATCC® 13048™*	WDCM 00175	R4607080
Pseudomonas aeruginosa ATCC® 27853™*	WDCM 00025	R4607060
Pseudomonas paraeruginosa ATCC® 9027™*	WDCM 00026	R4605210
Enterococcus faecalis ATCC® 19433™*	WDCM 00009	R4601990
Enterococcus faecalis ATCC® 29212™*	WDCM 00087	R4607030
Enterococci QC Organisms for testing of Slanetz and Bartley Agar		
Escherichia coli ATCC® 8739™*	WDCM 00012	R4607085
Escherichia coli ATCC® 25922™*	WDCM 00013	R4607050
Staphylococcus aureus subsp. aureus ATCC® 6538™*	WDCM 00032	R4607016
Staphylococcus aureus subsp. aureus ATCC® 25923™*	WDCM 00034	R4607010
Enterococcus faecalis ATCC® 29212™*	WDCM 00087	R4607030
Enterococcus faecalis ATCC® 19433™*	WDCM 00009	R4601990
***Pseudomonas aeruginosa* QC Organisms for testing of Pseudomonas CN Agar**		
Pseudomonas aeruginosa ATCC® 27853™*	WDCM 00025	R4607060
Pseudomonas aeruginosa ATCC® 9027™*	WDCM 00026	R4605210
Pseudomonas aeruginosa ATCC® 10145™*	WDCM 00024	R4607065
Escherichia coli ATCC® 8739™*	WDCM 00012	R4607085
Escherichia coli ATCC® 25922™*	WDCM 00013	R4607050
Enterococcus faecalis ATCC® 19433™*	WDCM 00009	R4601990
Enterococcus faecalis ATCC® 29212™*	WDCM 00087	R4601990
***Clostridium perfringens* QC Organisms for testing of TSC Agar**		
Bacillus subtilis ATCC® 6633™*	WDCM 00003	R4601221

Culti-Loops QC Organisms

Thermo Scientific™ Culti-Loops™ for quality control testing according to ISO 11133:2014

Many of Thermo Scientific Culti-Loops QC organisms are Certified reference materials.

Product	Sample numbers	Cat. No.
QC organisms for testing GCVP Agar (*Legionella* method)		
Legionella pneumophila ATCC® 33152™*	WDCM 00107	R4603950
Legionella anisa NCTC 11974™	WDCM 00106	R4601315
Enterococcus faecalis ATCC® 19433™*	WDCM 00009	R4601990
Enterococcus faecalis ATCC® 29212™*	WDCM 00087	R4607030
Pseudomonas aeruginosa ATCC® 27853™*	WDCM 00025	R4607060
Pseudomonas aeruginosa ATCC® 9027™*	WDCM 00026	R4605210
Escherichia coli ATCC® 8739™*	WDCM 00012	R4607085
Escherichia coli ATCC® 25922™*	WDCM 00013	R4607030
Prepared Media for the Quality Control testing according to ISO 11133:2014		
CASO Agar (ISO 11133)		PO5321A

ATCC Licensed Derivative™

* The ATCC Licensed Derivative Emblem, the ATCC Licensed Derivative word mark, and the ATCC catalog marks are trademarks of ATCC. Remel Inc. is licensed to use these trademarks and sell products derived from ATCC® cultures. The identity, purity, and authenticity of the Licensed Products are exclusively the responsibility of Remel Inc., and not ATCC.

Learn more at **thermofisher.com/water-microbiology**

thermo scientific

 LT2346A December 2023